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Mass psychogenic illness in organizations: An overview

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Published and unpublished reports of mass psychogenic illness, defined as the collective occurrence of physical symptoms and related beliefs among two or more persons in the absence of an identifiable pathogen, are reviewed with particular emphasis on organizational occurrences. A number of factors (e.g. boredom, sex-role identification, interpersonal conflict, physical stress) are identified as potential precipitating conditions, and the contagion of symptoms is discussed in terms of the convergence–contagion dichotomy in collective behaviour suggested by Milgram & Toch (1969).

There is some evidence to indicate that the actual occurrence of contagious psychogenic illness in organizations is more frequent than the available literature would suggest (Colligan & Smith, 1978). In the past, the underreporting of this phenomenon may be attributed to the fact that outbreaks of such illness are typically investigated by teams of industrial hygienists and medical professionals whose primary concern is the possibility of toxic exposure. The results of these investigations are then summarized in internal staff reports for limited distribution. Should environmental tests and medical evaluations prove inconclusive, a suggestion may be made that psychogenic factors played a contributory, if not primary, role in the aetiology of the illness. This conclusion is based more on the absence of a clearly identified pathogen than the presence of well-defined psychosocial precipitating factors. Unfortunately, merely labelling the phenomenon as 'psychosomatic' or 'anxiety induced' does little in promoting an understanding of the dynamics of the illness.

The present paper draws upon published and unpublished reports about contagious psychogenic illness in organizations. Sixteen studies are analysed in detail, of which seven involve work environments and nine involve school settings. These organizational studies may be viewed as complementary to investigations of such illness outbreaks in larger communities (e.g. Fallaize, 1923; Halliday, 1948; Yap, 1952) which are beyond the scope of the present review.

Table 1 presents summary descriptions of these investigations. The original reports vary considerably in terms of thoroughness and the nature of the data presented. In fact, the absence of a consistent and systematic data base has been one of the major impediments to a current understanding of this phenomenon. Nevertheless, it is hoped that sufficient information may be derived from these admittedly sketchy reports to provide direction for future research in this important area.

Table 1. *Summary descriptions of mass psychogenic illness*

Investigator(s)	Setting	Number affected	Symptoms	Trigger	Investigator's observations
1. Colligan, 1978[a]	Lawn furniture assembly plant in a rural midwestern town	48 females and 3 males in a plant population of 356 employees	Headache, bad taste in mouth, dizziness, lightheadedness	Strange odour	Affected workers were bothered more by production pressure ($P<0{\cdot}001$) and noise ($P<0{\cdot}05$) at the workplace than non-affecteds; affecteds took more sick days during an average month ($P<0{\cdot}05$) and scored higher on the Hysteria subscale of the MMPI ($P<0{\cdot}003$).
2. Colligan & Urtes, 1978[a]	Electronics assembly plant in urban midwestern location	51 females in a population of 330 workers	Headache, dizziness, lightheadedness, weakness, sleepiness	Strange odour	Work was perceived as boring and repetitious; poor management/labour relations; affected workers complained more frequently of temperature variations ($P<0{\cdot}05$), poor lighting ($P<0{\cdot}05$), and heavy production pressures ($P<0{\cdot}01$) than non-affecteds. Affecteds took significantly more sick days during average month than non-affecteds ($P<0{\cdot}01$), and scored significantly higher on Hysteria subscale of MMPI than non-affecteds ($P<0{\cdot}02$). Non-affecteds scored higher than affecteds on Eysenck extraversion scale ($P<0{\cdot}03$).
3. Folland, 1975[a]	Manufacturing plant in small south-eastern town	85 females and 59 males in a population of 290 workers	Dizziness, nausea, difficulty in breathing, bad taste in mouth, headaches	Strange odour	Work was perceived as boring and monotonous with a high production pressure.[b]

4. Goldberg, 1973	Inner-city school in large eastern city—all black	47 females and 6 males of 291 in school cafeteria at initial outbreak	Burning and painful throat, burning eyes, headaches, shortness of breath, coughing	Strange odour	Affected girls scored higher on paranoia scale, composite maladjustment scale of MMPI ($P<0{\cdot}05$), and had more absence from school than matched non-affecteds ($P<0{\cdot}05$). Affecteds also had more disciplinary problems ($P<0{\cdot}05$) and visits to school nurse ($P<0{\cdot}05$). Affecteds had more self-reported health problems ($P<0{\cdot}001$), and were more likely to help another girl during the outbreak ($P<0{\cdot}02$).
5. Kerckhoff & Back, 1968[a]	Dressmaking plant in a small southern town	59 females and 3 males in a plant population of 965	Nausea, skin rash, fainting, headache weakness	Bug bite	Outbreak was viewed as an expression of frustration and unresolved stress and strain in the workplace. Speed of recovery was slower in 'depression-prone' workers. The dissemination of belief was seen as promoting the contagion reaction.[b]
6. Knight, Friedman & Sulianti, 1965	Black school in southwestern Louisiana town of 3300	21 females, 1 male in a school of 400 students	Variable: involved dizziness, passing out, hyperventilation seizures, catatonic posturing	Threat of pending pregnancy tests throughout school	Considerable sexual promiscuity among girls. Parents and school officials believed outbreak was due to 'dope' in chewing gum; most attacks occurred when visitors or investigators were in school; MMPI revealed affecteds more prone to somatization; school atmosphere was strict and authoritarian.[b]
7. Levine, Sexton, Romm, Wood & Kaiser, 1974	Grade school in Alabama Town (population 600 people)	Enrolment of approximately 360 students. Attack rate=26% Total=93	Pruritus, skin rash, headache, itching, weakness, abdominal pain, shortness of breath, nausea	None identified	Outbreak started with fifth and sixth grade children and spread through successively lower grades. Illness spread from person to person and appeared to involve visual contact. Rumours circulated about pesticide poisoning, itching powder sprayed by vandals, etc. The newspapers described it as a mysterious illness.[b]

Table 1—*continued*

Investigator(s)	Setting	Number affected	Symptoms	Trigger	Investigator's observations
8. Mausner & Gezon, 1967	Primary school, midwestern rural community	84 females out of 174 females in a school population of 367	Gonorrhoeal vaginitis, vaginal discharge, swelling, local reddening	Rumours of 1 girl in the school, who had allegedly been diagnosed as having gonorrhoea, triggered off a panic response among parents	Authors agree that a hysterical outbreak is dependent on a number of conditions: (a) environmental stress, (b) host susceptibility, (c) support via rumour transmission, sympathy, collective action, etc.[b]
9. McEvedy & Beard, 1973	London Teaching Hospital	102 female nurses	Malaise, headaches, nausea, dizziness, palpitations	Believed outbreak of benign myalgic encephalitis	Affecteds had more hospital admissions ($P<0{\cdot}01$) and more sick days from work ($P<0{\cdot}06$) than a group of matched controls. The affecteds scored significantly higher on the N scale of Eysenck than the non-affecteds ($P<0{\cdot}05$).
10. McEvedy, Griffin & Hall, 1966	All girls' school in England	139 females in a school of 272	Vomiting, abdominal pain, feeling peculiar	None identified	Affecteds scored higher on N scale of Eysenck but showed no difference from controls on E scale. Illness spread explosively during school hours but not during after-school hours; spread from older to younger classes; correlated positively with conduct disorders.[b]
11. Moss & McEvedy, 1966	All girls' school in England	118 females in a school of 535	Swooning, moaning, chattering teeth, rapid breathing, faint, dizziness, headache, felt cold	Recent outbreak of polio in community	Outbreak of polio in community had made townspeople extremely anxious; girls who became ill tended to know one another and to witness the onset of illness; as compared to controls, affecteds scored higher on the E/N quadrant of the Eysenck.[b]

12. Phillips, 1974[a]	Manufacturing plant in a small southeastern town	54 female employees	Headache, nausea, respiratory problems, rash	Introduction of a new solvent with a different odour from the old one	No pathologies or toxic agents discovered.[b]
13. Schuler & Parenton, 1943	Louisiana high school	At least 5 females in a school of 275	Muscular twitching and spasms	Rumour of typhoid and excitement over forthcoming school dance	Authors discuss the role of suggestibility and secondary gain (along with conflict and anxiety) in the aetiology of mass hysteria.[b]
14. Shepard & Kroes, 1975[a]	Garment manufacturing plant in small, rural southwestern town	100 female employees in a plant population of 340 workers	Respiratory irritation, headaches, muscle weakness, nausea, weakness	Strange odour	Work was perceived as boring and repetitive, resulting in high production pressure, poor labour–management relations. Air was contaminated by lint generated by sewing machines.[b]
15. Stahl & Lebedun, 1974[a]	University Data Processing Centre in midwestern town of 50 000	Approximately 35 females out of workforce of 60 females	Nausea, vomiting, dizziness, fainting	Mysterious gas odour	Workers were high school graduates who had to work for financial reasons. Work was repetitive, highly structured and boring; strict work and dress codes and poor relations with supervisor. Construction work in area provided considerable noise, heavy pressure to work fast.[b]
16. Teoh & Yeoh, 1973	Girls' dormitory in a Malaysian college	6 female dormitory residents	Pressure on face and chest, difficulty breathing	Initiator reported a vision by a spirit in the form of an 8 foot black man with fangs	Conflict arising from simultaneous influences of Western and Malaysian traditions, sexual and moral conflicts. No difference between affecteds and non-affecteds on E/N dimensions of Eysenck Personality Inventory.

[a]Refers to an industrial incident.
[b]No statistical significance levels were reported.

SYMPTOMATOLOGY

A working definition of contagious psychogenic illness might be 'the collective occurrence of a set of physical symptoms and related beliefs among two or more individuals in the absence of an identifiable pathogen'. Implied in this definition, but not explicitly stated, is the notion that such illness is anxiety or stress induced. Table 1 presents a summary of the most prevalent symptoms in each of the 16 cases. As can be seen, in the majority of incidents the symptoms were of a subjective, non-specific nature consisting of such complaints as nausea, dizziness, headache and weakness. In general, the symptoms were transitory, being most pronounced in the original target environment and dissipating following rest at home or medical treatment (oxygen inhalation, sedation, etc.).

The more dramatic symptoms such as catatonic posture (Knight *et al.*, 1965), spasms and muscular twitching (Schuler & Parenton, 1943; Moss & McEvedy, 1966), and simulated gonorrhoeal vaginitis (Mausner & Gezon, 1967), were most frequent among adolescent populations.

Frequently the onset of symptoms, and their subsequent contagion, was preceded by a triggering event which was presumed to be causally related to the malady. Thus, the smell of a strange odour or gas (Phillips, 1974; Shepard & Kroes, 1975), the use of a new solvent in a work operation (Phillips, 1974), or a bug bite (Kerckhoff & Back, 1968) have been perceived by affected individuals as pathogenic sources. In still other cases, rumoured or actual epidemics involving polio (Moss & McEvedy, 1966), typhoid (Schuler & Parenton, 1943), or encephalomyelitis (McEvedy & Beard, 1973) have been offered as explanations for the exhibited symptoms. Clouding the diagnostic issue is the fact that the hypothesized causes appeared to fit well with the symptomatology and offered a plausible explanation for the observed illness. Despite negative results from medical and biochemical testings, for the affected individuals, the related beliefs provided identifiable (and potentially manageable) explanations for their discomfort. This is a critical factor in all such incidents since most victims appeared to feel a strong need to associate their illness with a physical rather than a psychogenic cause.

CHARACTERISTICS OF AFFECTED WORKERS

Sex

The most obvious characteristic of the affected individuals described in Table 1 is their sex. Of the 972 people evidencing symptoms in 15 of the 16 incidents reported in Table 1, 93 per cent ($n=900$) were women (the report of Levine *et al.*, 1974 does not permit a breakdown of the affecteds by sex and is excluded from this computation). While it could be argued that this percentage might be somewhat inflated owing to the fact that women were disproportionately represented in the overall population of non-affecteds as well as affecteds, there still appears to be a strong link between sex and mass psychogenic illness based upon the available data.

A number of researchers (Parsons, 1955; Jourard, 1964; Kagan, 1969) have described the instrumental vs. expressive nature of traditional male–female roles in American society. Males have been characteristically taught to develop those behaviours most conducive to goal attainment or problem solution (e.g. ambition, assertiveness, self-reliance, aggressiveness, individualism) whereas females have been encouraged to be sympathetic, loyal, submissive and emotionally expressive (behaviours conducive to smooth interpersonal interactions (Bem, 1974). Jourard (1964) has demonstrated consistent differences between men and women in their sensitivity

to, and expression of, underlying emotions and feelings. He has shown that men typically tend to be stoic or repressive, while women are much more willing to externalize motivational and emotive responses. Viewing transient psychogenic illness as the overt manifestation of psychological stress or anxiety, one might expect those individuals to be most susceptible who have been taught to subscribe to the traditional emotionally expressive female role. This point is also made by Kerckhoff & Back, (1968) in their report of a case of mass psychogenic illness in a garment manufacturing plant in the southern USA. They suggest that, in contrast to the non-affected workers, the affecteds seemed to focus on their emotive or physiological responses (e.g. fatigue, muscular tension, headache) to the exclusion of potential external sources of stress (e.g. work pace, work overload, etc.). Thus, their attention appeared to be emotionally directed rather than problem oriented.

A related issue which merits consideration is the possibility that the working woman who functions within the traditional female role is sometimes subject to considerable conflict from the opposing demands of job and home. She may experience qualitatively, as well as quantitatively, more stress than her male counterpart. One suggestion for future research would be to investigate the relationship between identification with traditional sex-roles and susceptibility to, and severity of, expressed symptoms.

Personality characteristics

With respect to the personality characteristics of the affected workers, research has been rather sketchy and inconclusive. The most commonly used psychological instrument has been the Eysenck Personality Inventory (EPI), which measures personality along the dimensions of extraversion–introversion and neuroticism–stability. The popularity of this scale is based primarily upon Eysenck's work with clinically diagnosed hysteric personalities in which he found hysterics to be more extraverted and neurotic than normals (Eysenck, 1957; 1958). Examination of Table 1 reveals mixed findings when the EPI was administered to affected and control samples in investigations of mass psychogenic illness. In one case the affecteds scored higher on both extraversion and neuroticism than non-affecteds (Moss & McEvedy, 1966); in another case, lower on extraversion with no difference on neuroticism (Colligan & Urtes, 1978); and in other cases, higher on neuroticism with no differences in extraversion (McEvedy *et al.*, 1966; McEvedy & Beard, 1973). At least part of this inconsistency may be due to the fact that contagious psychogenic illness is a distinct phenomenon, unrelated to 'clinical hysteria', the 'hysterical personality', or 'conversion reactions'. In fact, these terms have been specifically avoided in the present paper in an attempt to escape the semantic as well as theoretical confusion associated with their usage (Blindner, 1966; Cleghorn, 1969; Alarcon, 1973; Chodoff, 1974). As argued by Mayou (1975) and McEvedy & Beard (1963), contagious psychogenic illness appears to be a *social* phenomenon affecting a certain proportion of a *normal* population under conditions of psychological and/or physical stress. This does not imply that affected individuals do not differ from non-affected individuals along certain state/trait personality dimensions (e.g. anxiety levels, coping strategies, sex-role identification, etc.) which are yet to be defined. It does seem premature, however, to expect that the characteristics of those individuals becoming ill in a normal population under conditions of considerable stress and suggestibility, as exist in a contagion situation, will parallel those of institutionalized clinically diagnosed hysterics.

One finding that does appear worth pursuing, based on the cases reported in Table 1, is the tendency of affecteds to have a history of absenteeism from work prior to the contagious outbreak. McEvedy & Beard (1973), describing an outbreak of psychogenic illness among nurses in a London hospital, reported that the affecteds had more prior hospital admissions and sick days from work than a group of matched controls. Investigating an incident in a small midwestern electronics plant, Colligan & Urtes (1978) found that affected workers had taken significantly more sick days than non-affected workers employed in the same plant. This finding was replicated in a later investigation of a similar incident in a furniture assembly plant (Colligan, 1978).

While it is not possible to determine whether these differences in absenteeism rate between affecteds and non-affecteds reflect actual differences in their pre-outbreak health status or are indicative of differences in coping styles in response to stress, there is some evidence to support the latter. Knight *et al.* (1965), in their investigation of the spread of hyperventilation syndrome in a southwestern grade school, found a greater tendency toward somatization as measured by the Minnesota Multiphasic Personality Inventory (MMPI) among affected as compared to non-affected children. Similarly, in two separate cases, Colligan (Colligan, 1978; Colligan & Urtes, 1978) found a tendency for affecteds to score higher on the Hysteria subscale of the MMPI than non-affecteds. In response to a question asking the individual how likely it is that he/she would report to a doctor if 'feeling poorly' for a few days, both Kerckhoff & Back (1968) and Colligan & Urtes (1978) found a greater willingness to seek medical attention among affecteds than non-affecteds. Finally, medical examination conducted in the majority of cases reported in Table 1 revealed no acute or chronic pathologies which would distinguish the affected individuals from population norms. Indeed, in those cases where indices of general health (e.g. frequency and severity of diagnosed illnesses) were used, no differences were found between affecteds and non-affecteds (Kerckhoff & Back, 1968; Colligan, 1978; Colligan & Urtes, 1978).

It appears, then, that the higher absenteeism rate of affecteds may be more a function of coping style than general health status. It may be the case that such individuals show a greater tendency to express anxiety or stress through subjective, transitory physical symptoms or have learned through previous experience that the sick role is functional in removing the individual from perceived sources of stress (Mechanic, 1962). It is also possible that the affecteds are hypersensitive to their health state in general, reacting to, or over-reacting to, minor ailments that the general population typically ignores or accurately attributes to psychological stress or conflict (Bart, 1968). These alternatives are neither mutually exclusive nor exhaustive, and future research will be needed to better define the role of somatization and coping strategies in the aetiology of contagious psychogenic illness.

PSYCHOSOCIAL CHARACTERISTICS OF THE CONTAGIOUS OUTBREAK

It is important to note here that cases of mass psychogenic illness are not amenable to traditional experimental research designs and frequently lack adequate control groups. Thus, the following causal factors should be viewed as suggestive and not definite.

Environment

All of the incidents described in Table 1 occurred in either work or education settings. Both environments are formally structured involving well-defined roles and

regimentations. In addition, membership of these organizational structures is neither completely voluntary nor transient. Financial need (work) or legal sanctions (school) require the individual's active participation on a relatively continuous basis. Stresses or conflicts associated with these environments, therefore, may be perceived as chronic and the avenues of escape extremely limited. For the purposes of the present paper, attention will be limited to a discussion of those characteristics of the work environment which have been implicated as possible precipitating factors in the aetiology of contagious psychogenic illness.

Boredom

Of the seven industrial incidents reported in Table 1, four occurred in plants engaged in sewing operations (Kerckhoff & Back, 1968; Phillips, 1974; Folland, 1975; Shepard & Kroes, 1975), two in assembly plants (Colligan, 1978; Colligan & Urtes, 1978), and one in a data keypunch centre (Stahl & Lebedun, 1974). All of these industrial operations involved repetitive, perceptual–motor tasks performed at fixed work stations and fixed production paces. While a number of researchers have demonstrated considerable individual variability in susceptibility to boredom (Smith, 1955; Blood & Hulin, 1967; Siegel, 1969), these work conditions closely parallel the objective criteria traditionally used to define monotony and mental fatigue (McFarland, 1953; Tidwell & Sutton, 1954; Turner & Lawrence, 1965). Boredom, in turn, has been related to a variety of indices of psychological and physical well-being, including muscular tension (Coffer & Appley, 1968), overall job dissatisfaction, depression and somatization (Caplan *et al.*, 1975) and increased catacholamine secretion (Frankenhaeuser, 1971).

Production pressure

In six of the seven reports on industrial incidents listed in Table 1—Phillips (1974) is the exception—specific mention is made of the fact that the workers appeared to be under considerable pressure to increase production. In at least three cases (Kerckhoff & Back, 1968; Shepard & Kroes, 1975; Colligan & Urtes, 1978), the strains of heavy production demands were exacerbated by considerable unwanted overtime.

Physical stressors

There is some evidence to indicate that various physical characteristics of the work environment may have contributed to the workers' overall level of stress. Stahl & Lebedun (1974) reported that keypunch operators who developed symptoms of nausea, vomiting, dizziness and fainting at a midwestern university data processing centre complained of excessive noise from dynamite blasts and pneumatic hammers at a nearby construction site. Noise was also a frequent complaint among the furniture assemblers studied by Colligan (1978). Shepard & Kroes (1975) found discomforting levels of noise and air contamination from dust and lint generated by sewing machines in their investigation of an incident at a garment manufacturing plant. Poor lighting and variations in temperature were reported sources of irritation among the affected assembly workers in a small midwestern electronics plant described by Colligan & Urtes (1978). Finally, fumes or odours from solvents (Phillips, 1974; Colligan & Urtes, 1978), sealers (Folland, 1975), truck and fork lift exhaust (Colligan, 1978) and pesticides (Kerckhoff & Back, 1968; Shepard & Kroes, 1975) have also been

mentioned by workers as bothersome (though uninjurious, as indicated by environmental sampling).

Labour–management relations

Poor labour–management relations were specifically noted by investigators in five of the seven industrial incidents presented in Table 1. The nature of the problems ranged from discontent over rigid dress codes and supervisory techniques (Stahl & Lebedun, 1974) to the lack of a clear organizational structure (Kerckhoff & Back, 1968; Shepard & Kroes, 1975). In both incidents in which the first author has been involved (Colligan, 1978; Colligan & Urtes, 1978), workers had anonymously filed complaints with the Occupational Safety and Health Administration approximately 1 year prior to the outbreak, protesting about various conditions in the work environment.

At a more basic level, there is some evidence to indicate strained or ambivalent relationships between the affected workers and their first line supervisors. Thus, Kerckhoff & Back (1968) found that, compared to non-affected workers, affected workers were more reluctant to discuss work-related problems with their supervisors. Shepard & Kroes (1975) placed considerable emphasis on supervisory conditions in their analysis of an incident in a garment manufacturing plant. Two years prior to the outbreak of illness, the company had replaced the female supervisors with males inexperienced in garment production. While generally liked by their employees, the new supervisors were perceived as naïve and inexperienced about sewing operations and of little help in solving or understanding work-related problems. Finally, Colligan & Urtes (1978), in their investigation of an electronic component assembly plant, found that compared to non-affecteds, affecteds reported: (a) greater feelings of pressure from having too many bosses, (b) more frequent feelings of getting conflicting orders from superiors, and (c) feelings that they had too little authority to carry out the responsibilities assigned to them.

Lack of communication

With one exception (Colligan & Urtes, 1978), all the industrial incidents described in Table 1 occurred in relatively noisy environments (e.g. sewing operations, keypunching). Compounding the stress due to physical effects of noise is an impairment of interpersonal communications. This point was noted by Stahl & Lebedun (1974) who observed that communication between the various keypunch operators (and especially friends) was limited by the noise of the machines and the nature of the work. The only opportunity for communication was provided by two 15 minute coffee breaks and during lunch. Even here, workers took their coffee and lunch breaks at assigned times, precluding sharing these times with friends. Shepard & Kroes (1975) found little social interaction among the sewing machine operators in their investigation of the garment manufacturing plant, and reported that many of the affected workers expressed feelings of loneliness and isolation.

Social support has been shown to be a potent moderator of both the physical and psychological impact of stress upon the individual (Jourard, 1964; Cobb, 1974, 1976; Caplan *et al.*, 1975). As Cobb (1976) has suggested, however, social support may be conceptualized as a multidimensional construct composed of at least three independent components: (a) the affective or emotional element, (b) the value or self-esteem element, and (c) the informational element. The first two refer to the individual's feelings of

being cared for and needed, respectively. The third refers to the individual's dependence on others for clarification and verification of existing beliefs, perceptions and feelings. Cobb further suggests that these components combine to buffer the individual against stress by facilitating the development of coping and adaptation mechanisms. In this respect the affective and value components of social support may be seen as motivational factors encouraging the individual to cope; the informational component provides the individual with the necessary perceptual framework to identify the origin of the stress and select the most appropriate response alternative.

Although systematic sociometric data are weak or non-existent in many of the reports presented in Table 1, there is some tentative evidence to indicate that the affected workers received little informational support prior to the outbreak of illness. Thus, Kerckhoff & Back (1968), in summarizing the characteristics of the affected workers, state that 'affected women are more likely to have this type of (role) conflict and to deny its significance. Such denial is therefore an important correlate of becoming affected' (p. 84).

Stahl & Lebedun (1974) likewise noted a reluctance on the part of the affected workers to discuss work-related dissatisfaction. In this case, however, organizational sanctions prohibited informational exchange regarding job dissatisfactions. In fact, one worker was admonished for openly looking for another job.

This analysis of the social support process deserves greater scrutiny in future investigations. Based upon the available data it appears that affective or value support, by themselves, may not be sufficient to lower susceptibility to mass psychogenic illness. In fact, by establishing greater cohesion and empathy, these factors may contribute to the contagion of illness. Informational support, on the other hand, which accurately focuses on the sources of stress and suggests effective coping strategies and alternative means of adaptation, may produce an immunizing effect.

THE DYNAMICS OF CONTAGION

In their discussion of collective behaviour. Milgram & Toch (1969) distinguish between 'contagion' and 'convergence'. Contagion refers to the spread of affect or behaviour from group member to member, one person serving as the stimulus for the imitative act of another. Convergence refers to situations in which group members have, independently of one another, developed common affects or response patterns which are expressed simultaneously. Although not mutually exclusive, it appears that the initial stages of mass psychogenic illness more closely parallel the process of convergence than contagion.

Given the overall level of stress described in the work sites presented in Table 1, it seems probable that a considerable number of workers experienced anxiety and related somatic complaints at some time prior to the 'outbreak'. Internal (Kerckhoff & Back, 1968) and external (Stahl & Lebedun, 1974) restraints against openly discussing these feelings with others precluded the possibility of achieving a shared perspective which would have permitted a realistic identification of the potential sources of stress, suggesting alternative coping mechanisms or remedial strategies. The poor relations between the affected workers and their supervisors (Kerckhoff & Back, 1968; Stahl & Lebedun, 1974; Shepard & Kroes, 1975; Colligan & Urtes, 1978) may have further diminished not only the informational support available to the workers, but their value or self-esteem support as well. Given this situation, the expression of

symptoms by the initiator (or initiators) may be perceived as a direct response to experienced life and job stresses. The presence of a discernible physical agent (e.g. an odour, a bug bite, etc.) may facilitate the expression of these symptoms by justifying their externalization. The illness is thus perceived as having been 'caused' by a tangible characteristic of the workplace and the affected individual can legitimately escape from the hazardous work environment and refuse to return until the situation has been corrected. Even though the presumed causal agent may later prove non-toxic, the affected workers have succeeded in calling attention to their discomfort and initiated activities to identify and rectify the source of their problems.

The sudden and dramatic illness of the initiator, frequently accompanied by allusions to hazardous agents in the work environment, serves two functions. It informs others who have previously 'suffered in silence' with similar stress-related discomforts that their feelings are shared by at least one other person and are possibly the result of a physical pathogen in the environment. Secondly, the expression of symptoms by the model may serve to disinhibit the expression of these symptoms in the observing others by implying that such expression is now acceptable (Bandura & Walters, 1963). This suggests that, in the early stages of a mass psychogenic reaction, many of the affecteds experienced various discomforts prior to the outbreak. The actions of the model served to inform others that the expression of these symptoms was no longer inappropriate. As the number of affecteds increase and rumours of the hazard spread through the plant, the resulting anxiety may induce symptom formation in previously unaffected workers. At this point contagion follows upon conversion and the illness spreads rapidly through the worksite.

This interpretation is in general agreement with the findings of Kerckhoff & Back (1968) who noted a sequential decline in symptom severity as the epidemic progressed. Early cases of illness were the more dramatic and severe; as the number of affecteds increased, however, symptom severity decreased. Those with prior high levels of existing stress and concomitant strain would be initially most susceptible to the disinhibitory effects of the initiator. The dramatic nature of the illness coupled with the suggestion of a physical hazard in the workplace could then predispose others to interpret their newly experienced arousal as symptomatic of the same illness (Schachter & Singer, 1962).

Given this course of events, a critical theoretical issue involves an explanation of the limits of contagion. That is, given the powerful influences toward contagion, why is it that not everyone becomes affected? Although existing relevant data are meagre, at least three elements seem worthy of future research consideration. The first is the level of stress and strain existent in the affected and non-affected workers prior to the outbreak of illness. Presumably, individual susceptibility to an illness reaction will be positively related to pre-outbreak discomfort, especially at the convergence stage.

A second factor, affecting the *contagion* of the symptoms, appears to be the sociometric patterns operating in the environment. Independent of the existing level of stress, reference groups may inhibit or facilitate individual expression of symptoms by their implied or explicit norms regarding the acceptability of sick role behaviours. As Gehlen (1977) has suggested, the importance of existing role relationships in facilitating contagion probably increases as the level of pre-outbreak stress decreases.

Finally, a third factor meriting closer scrutiny is the type of informational support available to the stressed individual prior to the outbreak which would allow for shared identification and verification of the sources of discomfort and suggest

alternative coping strategies. To the extent that the individual is able accurately to attribute existing discomforts to life and job-related stressors, susceptibility to mass psychogenic illness should decrease. In fact, a careful debriefing of the workforce as to the nature and dynamics of contagious psychogenic illness may be the most effective means of bringing the epidemic to an end (Gehlen, 1977).

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